BCM50 Rls 6.0

Router - IP Firewall

Task Based Guide

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IP Firewall

Overview

The BCM50 IP Firewall Filters feature is one of the security features BCM offers to protect your network against intruders. The security and firewall features are also used for controlling what outside resources your users will be able to access.

Note: This guide relates to the BCM50a/ba and BCM50e/be models only.

Note: Although the BCM50a/ba models will not be supplied with BCM 6.0, it is possible to upgrade the variants of these models to BCM 6.0, if they were originally supplied with BCM50 R2 or BCM50 R3 software.

Note: The BCM50 Integrated Router is almost identical to the Business Secure Router (BSR) models. BCM50a/ba routers are based on the BSR252 and BCM50e/be routers are based on the BSR222.

BCM50 Integrated Router and Firewalls

The BCM50 Integrated Router firewall is a stateful inspection firewall and is designed to protect against Denial of Service attacks. The BCM50 Integrated Router's purpose is to allow a private Local Area Network (LAN) to be securely connected to the Internet. The BCM50 Integrated Router can be used to prevent theft, destruction and modification of data, as well as log events, which may be important to the security of your network. The BCM50 Integrated Router also has packet-filtering capabilities.

Stateful Packet Filters

BCM50 Integrated Router supports stateful packet filtering for IP protocols. Stateful packet filters monitor active sessions and record session information such as IP addresses and port numbers. They maintain state information for each flow (TCP, UDP or ICMP). Stateful filters use the state information to determine if a packet is responding to an earlier request that has been validated by the rule set. If the packet is in response to a previous request, the packet is treated in the same manner. It will either be blocked or allowed through.

Stateful packet filters protect your network against Internet attacks such as source spoofing, where an attacker pretends to be a trusted user by using an IP address that is within the accepted range of IP addresses of your internal network. BCM50 Integrated Router stateful packet filtering validates that addresses coming from outside the network are valid outside addresses. Stateful packet filters also protect your network from a denial-of-service

attack, where an attacker tries to block valid users from accessing a resource or a server.

Stateful filtering supports TCP, UDP, IP, and ICMP. Stateful filtering supports the following applications: H.323, FTP, HTTP, POP3, Telnet, SMTP, DNS, DHCP, TFTP, GOPHER, FINGER, NNTP, NetBIOS, POP2, RPC, SNMP and SUNNFS.

Denial of Service (DoS) Attacks

Denials of Service (DoS) attacks are aimed at devices and networks with a connection to the Internet. Their goal is not to steal information, but to disable a device or network so users no longer have access to network resources. The BCM50e/be Integrated Router is pre-configured to automatically detect and thwart all known DoS attacks.

Default Configuration

By default, the BCM50 Integrated Router firewall is configured to allow all traffic originating from the LAN and deny all traffic originating from the WAN. Any traffic responding to requests from the LAN to the WAN, e.g. http traffic is allowed through the firewall and returned to the request originator.

The exception to WAN originating traffic is IKE requests. IKE (Internet Key Exchange) is used to set up VPN’s (Virtual Private Network) connections.

Firewall Rules

Rule Direction

Rules can be configured for the direction of traffic in the following ways:

- LAN to WAN: This direction is designed to stop some or all users on the network accessing some services on the Internet. For example, if certain users are less productive due to inappropriate usage of MSN Messenger, those users (essentially IP Addresses) can be blocked from using the MSN Messenger port (TCP port 1863).
- WAN to LAN: By default, all traffic except IKE requests are blocked from the WAN to the LAN. It is possible to allow certain traffic, e.g. Element Manager, from a specific or multiple users based on their WAN IP Address.
- LAN to LAN: By default there are no rules configured for this option. This allows computers on the LAN to manage the BCM50 Integrated Router and communicate between networks or subnets connected to the LAN interface.
- WAN to WAN: By default all packets are blocked for this option. This prevents computers on the WAN from using the BCM50 Integrated Router as a gateway to communicate with other computers on the WAN and/or managing the BCM50 Integrated Router.

Rule Order

Careful consideration should be given to the order in which rules should be applied. For example, you should configure rules to allow specific traffic or ports before more general rules that block traffic. Otherwise the specific traffic will not pass through the firewall as the more general rule blocking traffic will be applied first.

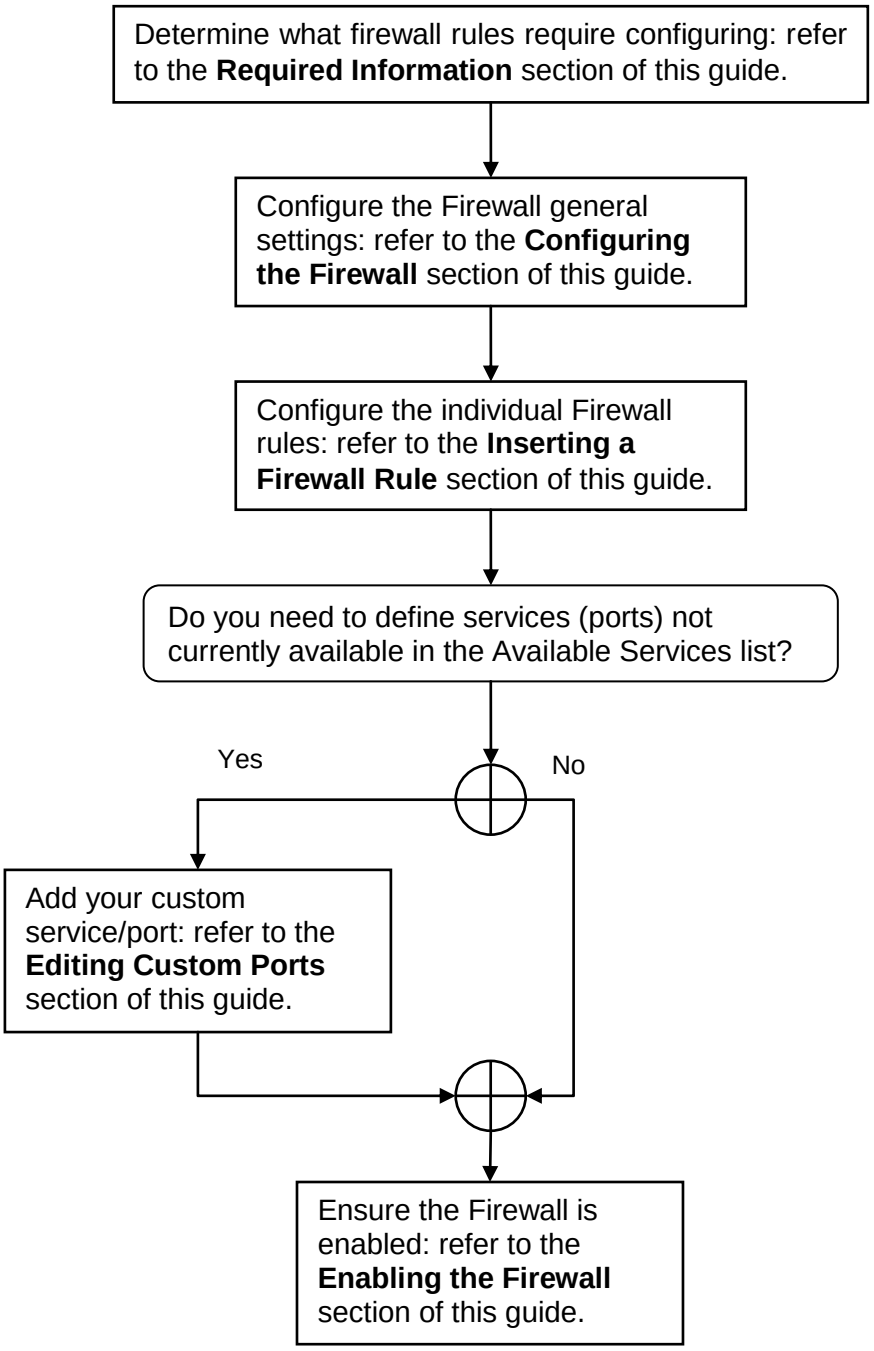
Required Information

Before configuring the Firewall, you may wish to obtain the following information:

- State the intent of the rule. For example, “This restricts all IRC access from the LAN to the Internet.” Or, “This allows a remote Lotus Notes server to synchronize over the Internet to an inside Notes server.”
- Is the intent of the rule to forward or block traffic?
- What direction of traffic does the rule apply to?
- What IP services will be affected?
- What computers on the LAN are to be affected (if any)?
- What computers on the Internet will be affected? The more specific, the better. For example, if traffic is being allowed from the Internet to the LAN, it is better to allow only certain machines on the Internet to access the LAN.
- Which order should the rules be applied?

Flow Chart

The flow chart below shows which sections of the guide you should use.


Determine what firewall rules require configuring: refer to the **Required Information** section of this guide.
Configure the Firewall general settings: refer to the **Configuring the Firewall** section of this guide.
Configure the individual Firewall rules: refer to the **Inserting a Firewall Rule** section of this guide.
Do you need to define services (ports) not currently available in the Available Services list?
Yes
No
Add your custom service/port: refer to the **Editing Custom Ports** section of this guide.
Ensure the Firewall is enabled: refer to the **Enabling the Firewall** section of this guide.

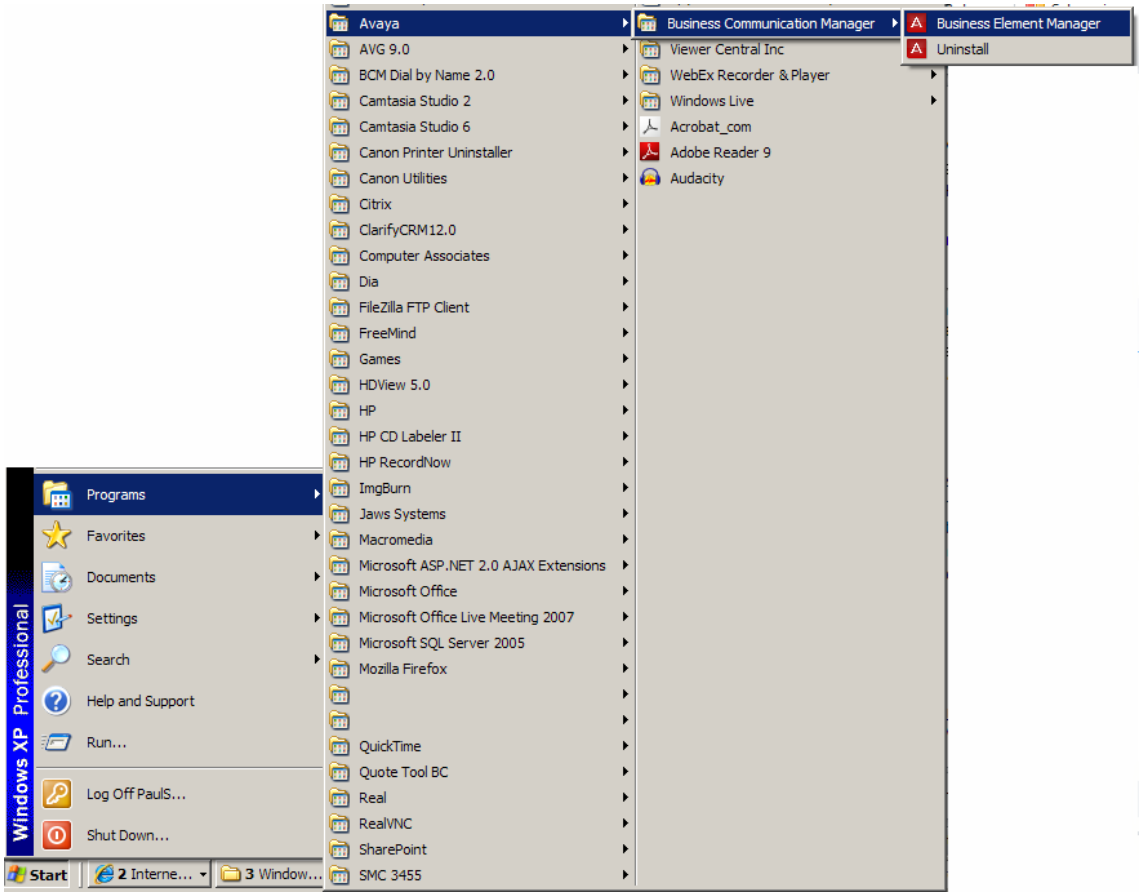
Accessing the Web Router GUI

There are two methods of accessing the Web Router GUI, independent on which model you are configuring:

- Via Element Manager (management application for all BCM50 models)
- Directly from a web browser

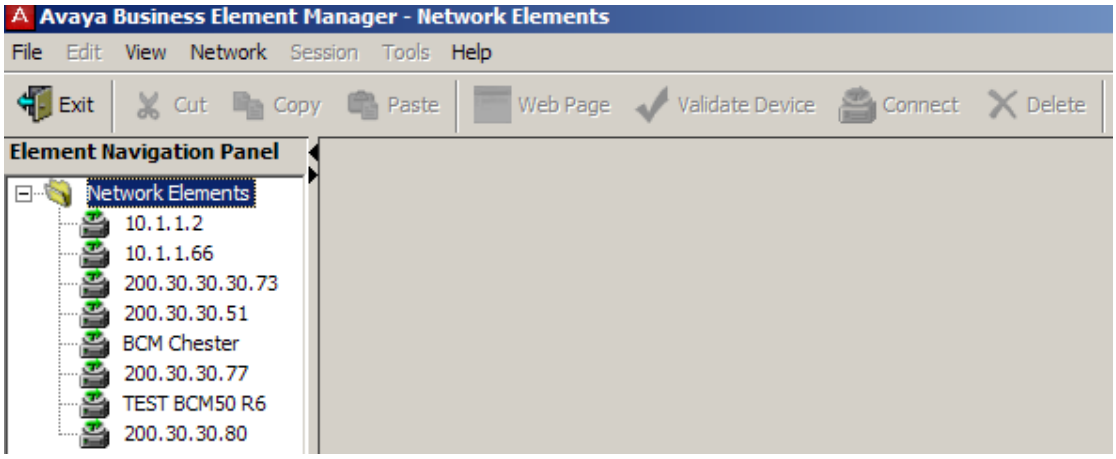
From Element Manager

1. To access the Business Element Manager application from the Start Menu, navigate to **Start**, **Programs**, **Avaya**, **Business Communications Manager**, **Business Element Manager**.

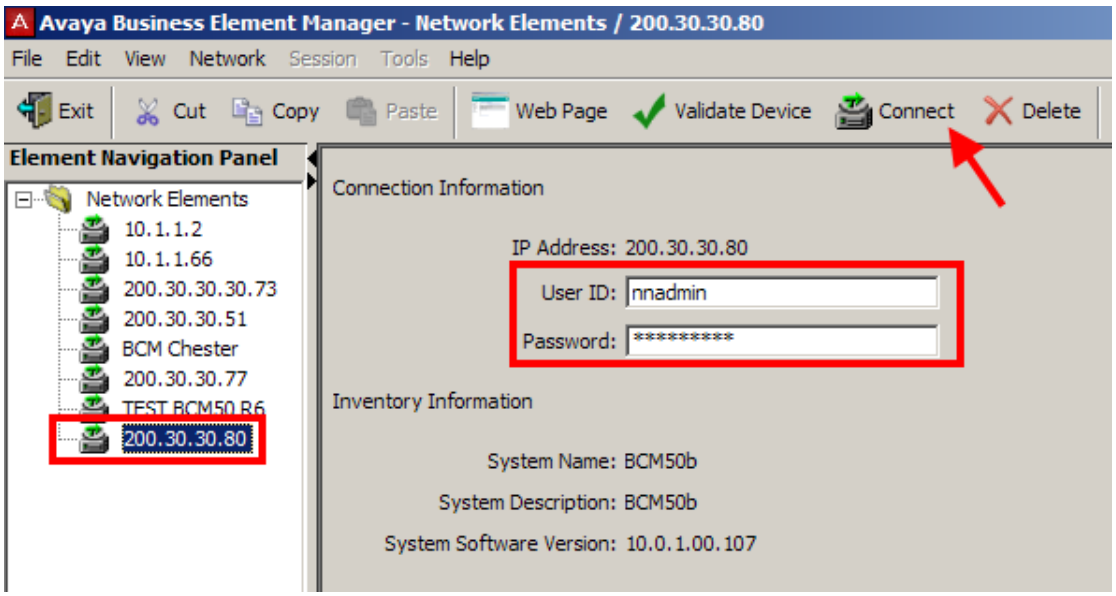


2. Alternatively, double-click on the **Business Element Manager** desktop icon.

3. You will be presented with the **Element Manager** interface.

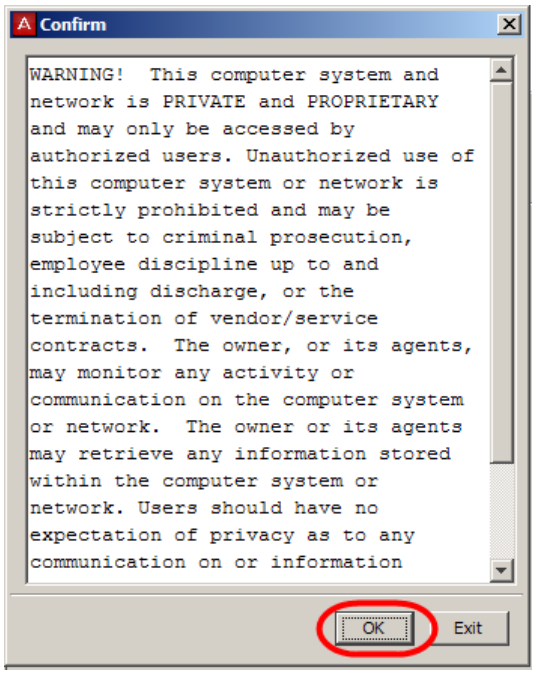


4. Open the **Network Elements** folder and select the IP Address of the BCM.

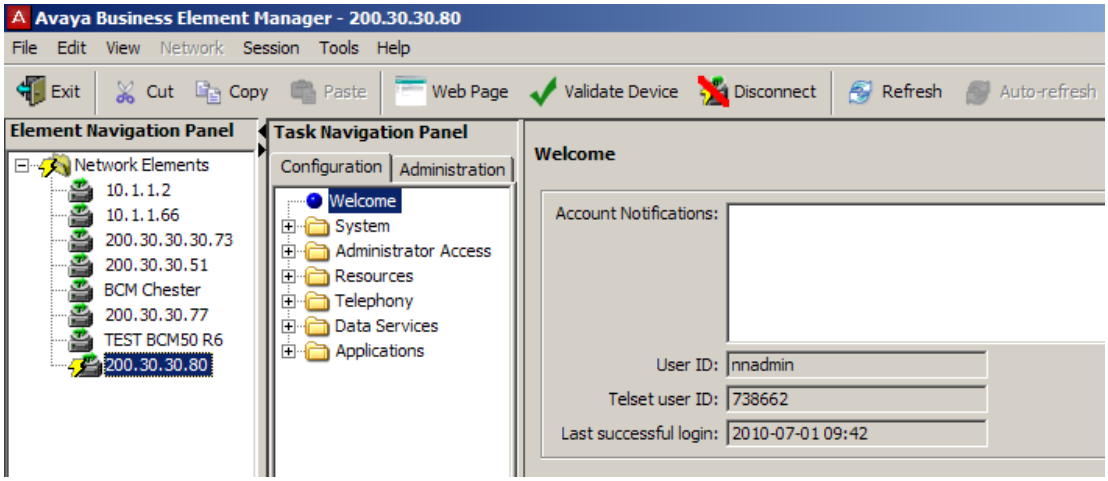


5. Enter the User Name of the BCM in the User Name field, by default this is **nnadmin**. Then enter the Password in the Password field, by default the password is **PlsChgMe!**. Click the **Connect** button.

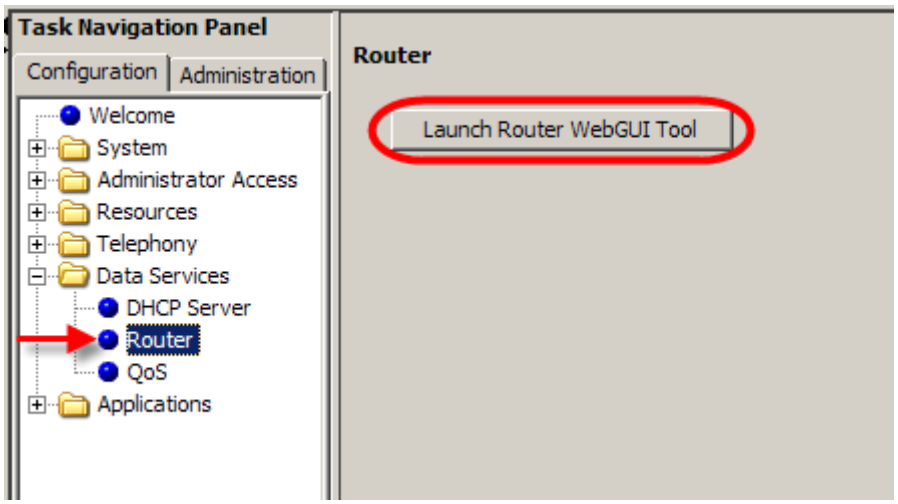
6. A warning screen will appear, read the warning and click **OK**.


Confirm
WARNING! This computer system and network is PRIVATE and PROPRIETARY and may only be accessed by authorized users. Unauthorized use of this computer system or network is strictly prohibited and may be subject to criminal prosecution, employee discipline up to and including discharge, or the termination of vendor/service contracts. The owner, or its agents, may monitor any activity or communication on the computer system or network. The owner or its agents may retrieve any information stored within the computer system or network. Users should have no expectation of privacy as to any communication on or information
OK
Exit

7. You will be presented with the Element Manager interface.

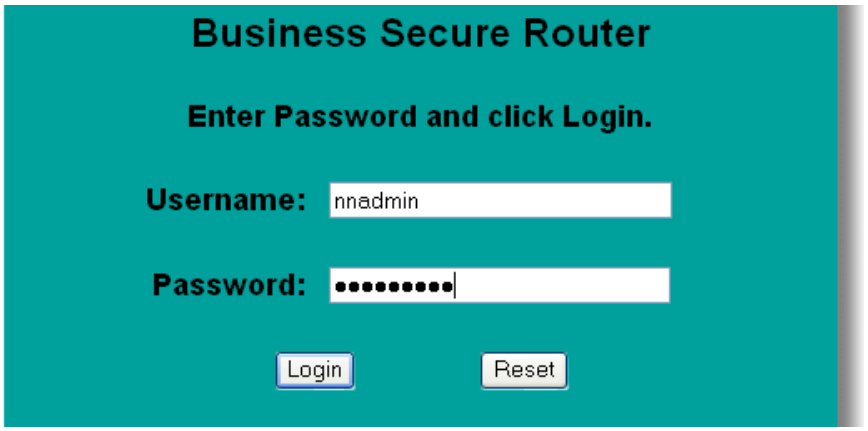


8. Click the **Data Services** link, select the **Router** link and click the **Launch Router Web GUI Tool** button.

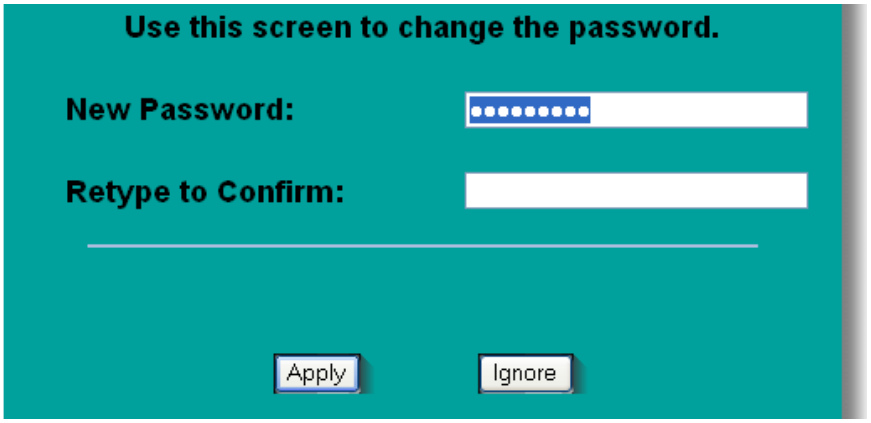


9. The Business Secure Router logon screen will be displayed. Enter the Username (default = **nnadmin**) and Password (default = **PlsChgMe!**) and click **Login**.

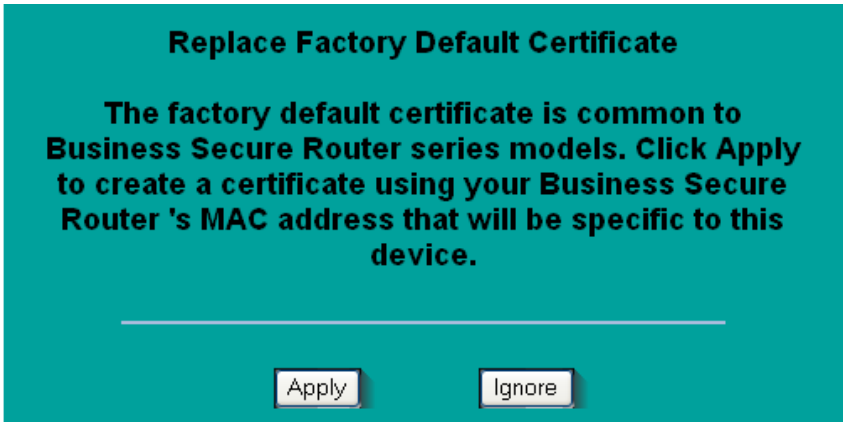
Note: if the above logon details do not work, try Username = **admin**, and Password = **setup.**



10. Change the password and click **Apply**, or click **Ignore** to continue.



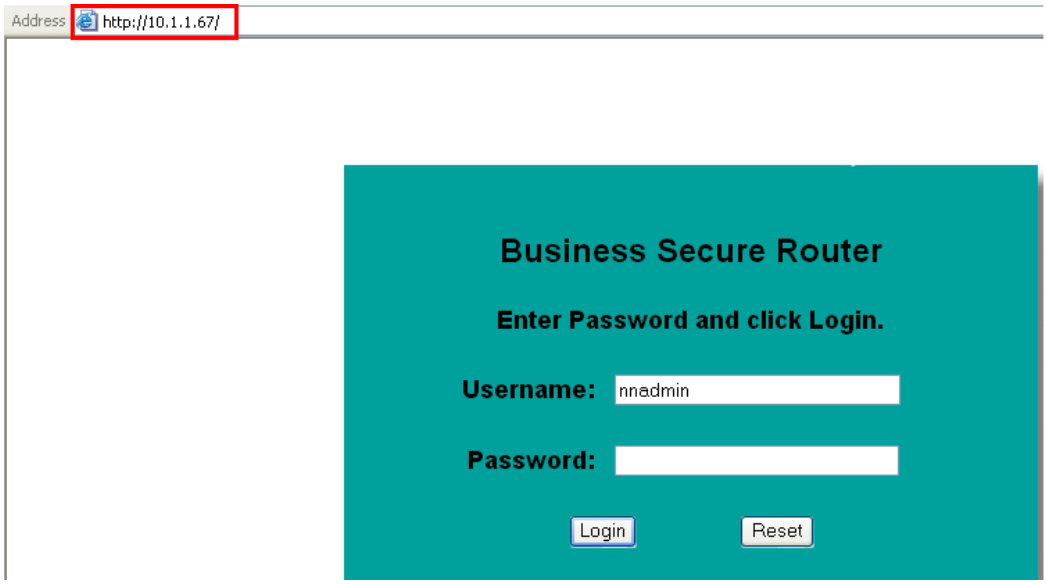
11. To replace factory certificate click **Apply** or **Ignore** to continue.


Replace Factory Default Certificate
The factory default certificate is common to Business Secure Router series models. Click Apply to create a certificate using your Business Secure Router 's MAC address that will be specific to this device.
Apply
Ignore

12. The Main Menu screen will display.

Access Directly via a Web Browser

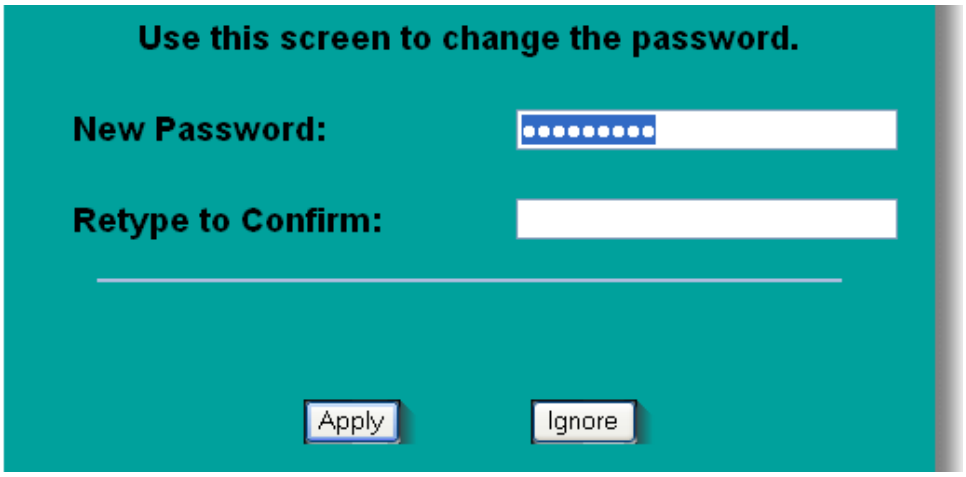
1. Open your web browser. In the address bar, type in **http://<router card LAN IP Address>/** and press **Enter**.



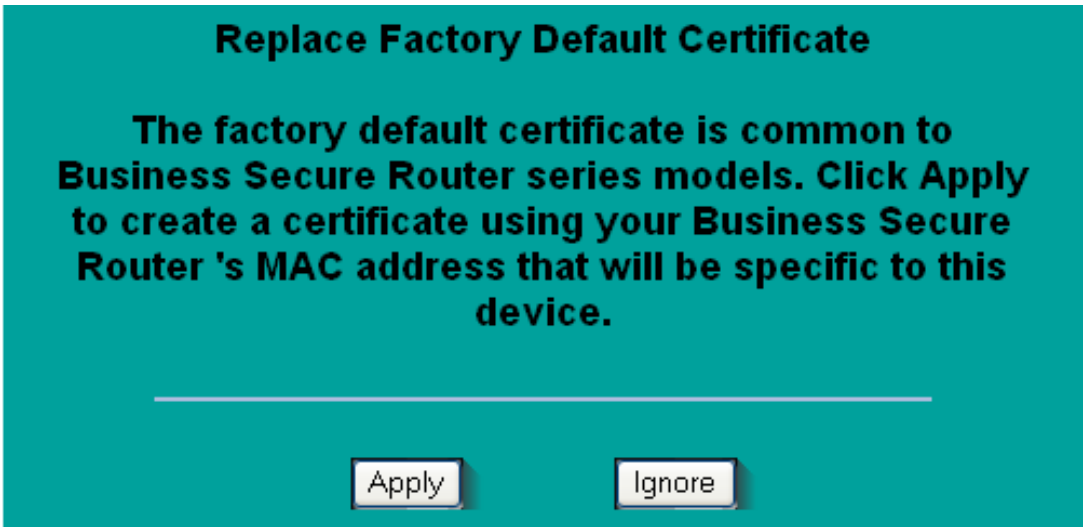
2. The Business Secure Router logon screen will be displayed. Enter the Username (default = **nnadmin**) Password (default = **PlsChgMe!**) and click **Login**.

Note: if the above logon details do not work, try Username = **admin** Password = **setup.**

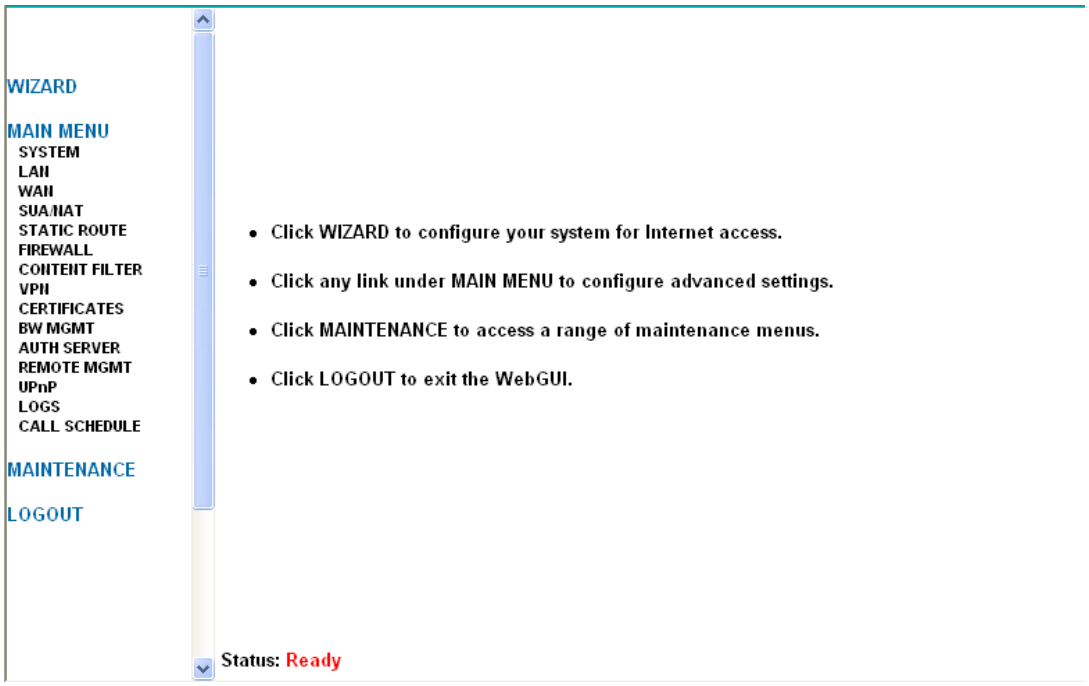
3. Change the password and click **Apply**, or click **Ignore** to continue.



4. To replace factory certificate click **Apply** or **Ignore** to continue.


Replace Factory Default Certificate
The factory default certificate is common to Business Secure Router series models. Click Apply to create a certificate using your Business Secure Router 's MAC address that will be specific to this device.
Apply
Ignore

5. The Main Menu screen will display.



BCM50 Integrated Router Firewall Configuration

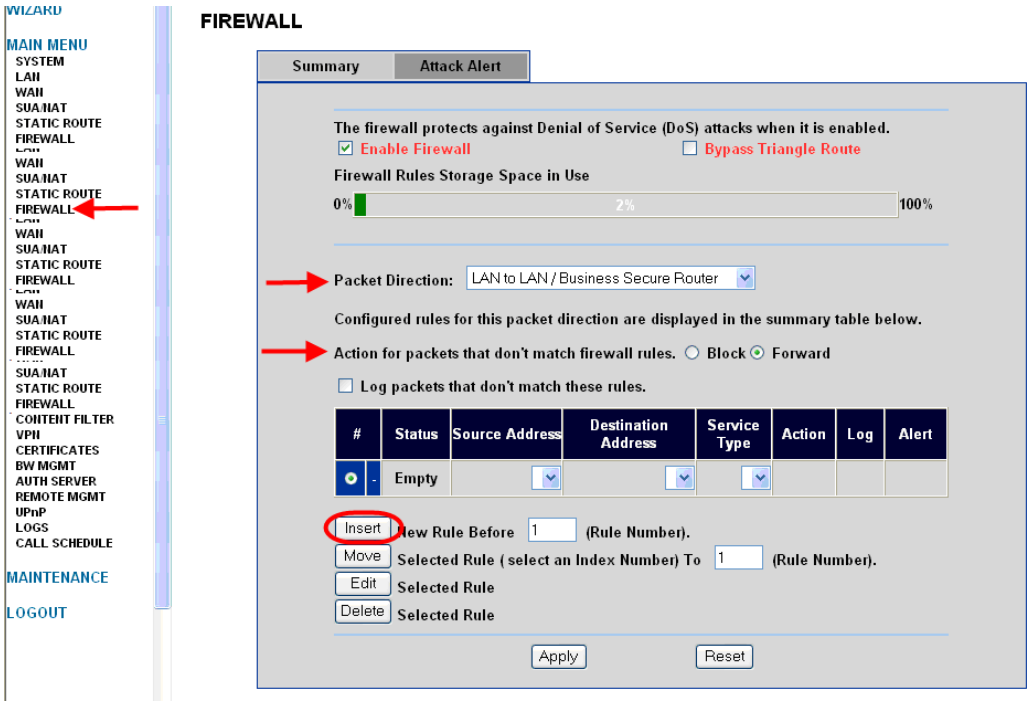
Configuring the Firewall

Use the following procedure to configure the Firewall options on the BCM50 Integrated Router.

1. Access the Web Router GUI (refer to the **Accessing the Web Router GUI** section of this guide).

2. From the **Main Menu**, click on **Firewall**.

3. On the **Summary** tab, configure the options as required:
   - Select a **Packet Direction**, e.g. LAN to WAN etc.
   - Select the **Action for packets that don't match firewall rules** for the chosen **Packet Direction**.



4. Click on **Insert** to add a new rule (refer to **Inserting a Firewall Rule** below).

Note: Consider carefully the order in which the rules are applied. If using multiple rules and re-ordering is required, select the rule to move and use the **Move** button to place the rule correctly.

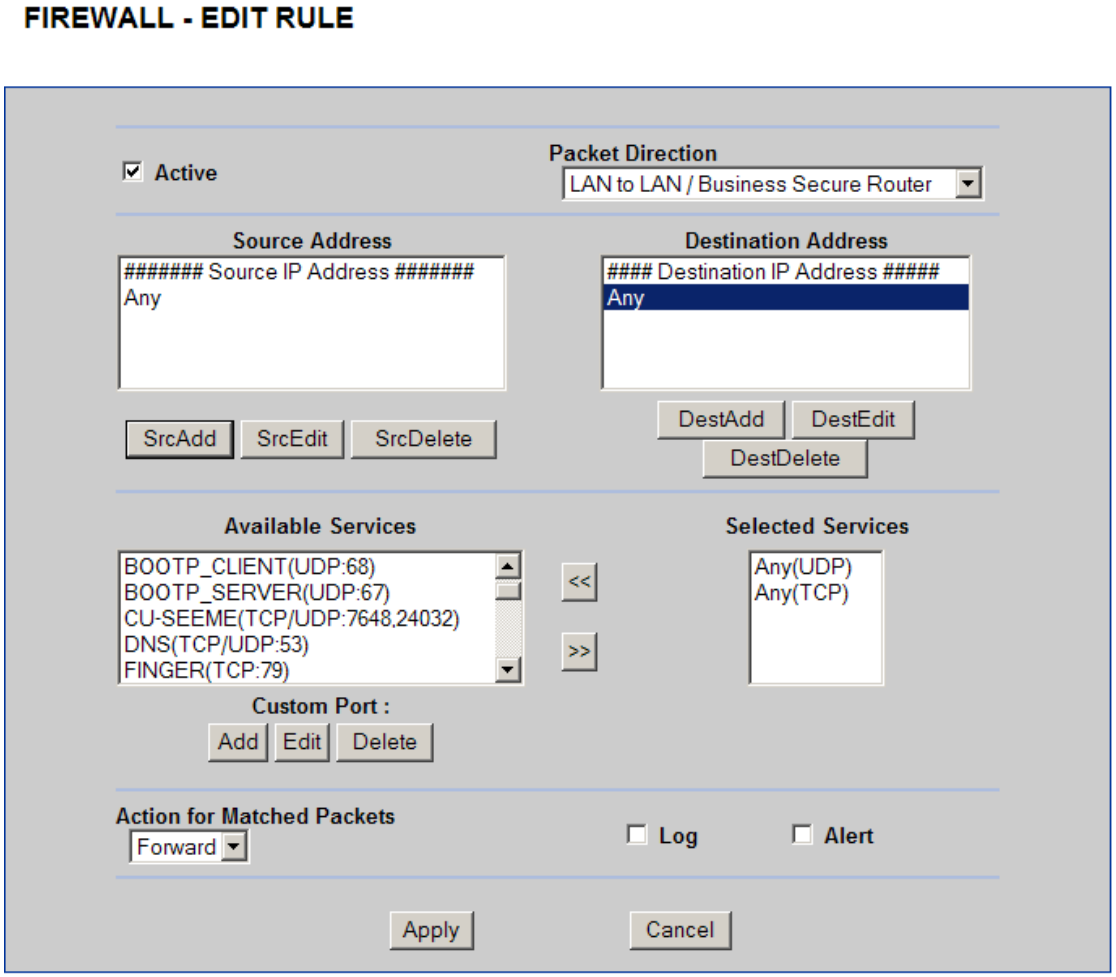
5. You can also **Edit** (for configuration instructions, refer to the **Inserting a Firewall Rule** section below), or **Delete** existing rules.

6. Click **Apply** to save your settings.

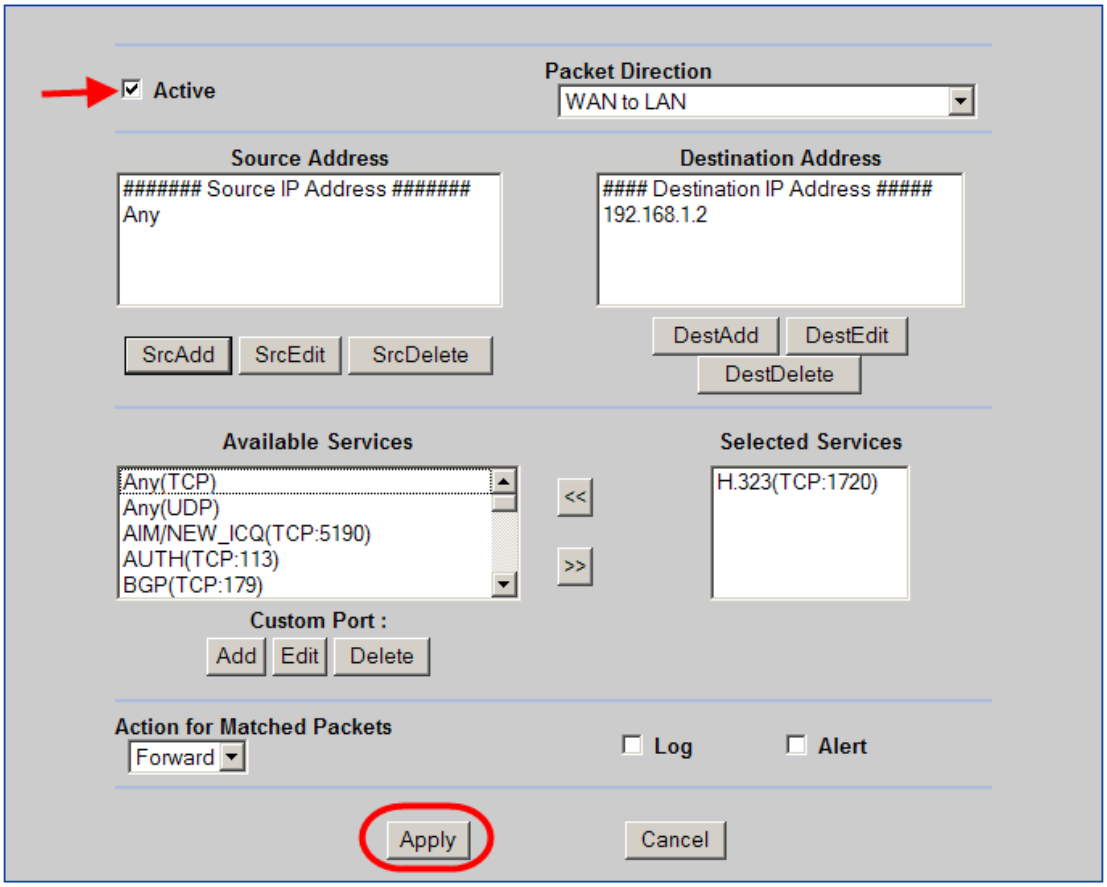
Inserting a Firewall Rule

Use the following procedure to configure individual Firewall rules.

1. In the **Firewall – Summary** screen, click on **Insert**. The **Firewall – Edit Rule** screen will display.



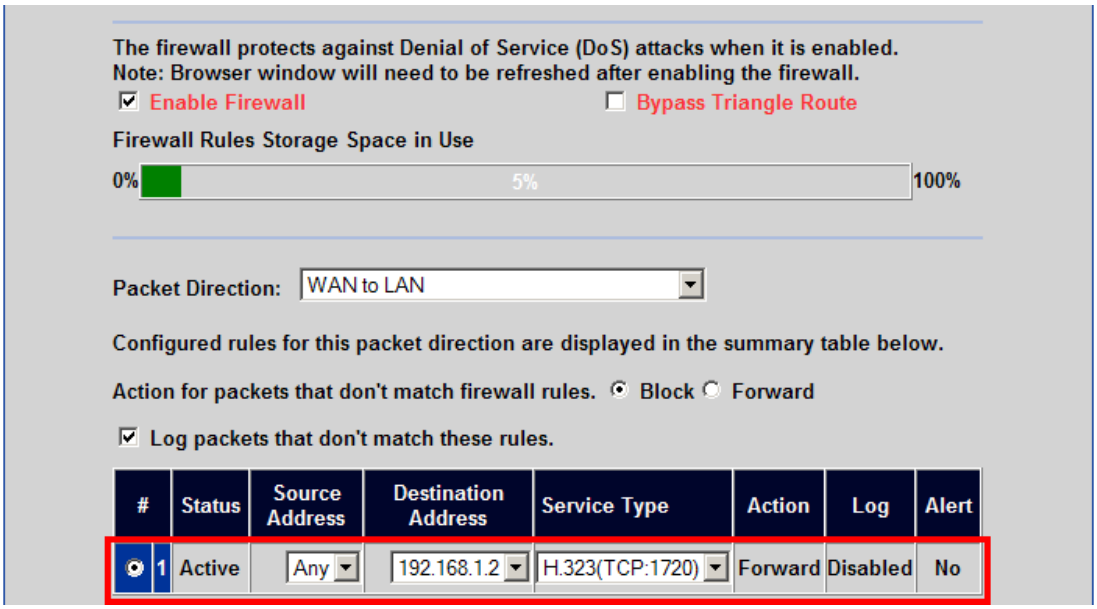
2. Configure the rule as required:
   - Use the **Add**, **Edit**, or **Delete** buttons for **Source** or **Destination** address to define where the data traffic is coming from and going to. You may need to remove the default “Any” setting as this defines all source/destination IP Addresses.
   - Select which **Services** the rule can use. If the service you require is not defined in this list, refer to the **Editing Available Services** section below.
   - Select the **Action for Matched Packets** (forward or block).



3. Ensure the **Active** checkbox is ticked if you want this rule to be implemented.

4. Click **Apply** to save your settings.

5. The rule will appear in the table.


The firewall protects against Denial of Service (DoS) attacks when it is enabled.
Note: Browser window will need to be refreshed after enabling the firewall.
Enable Firewall
Bypass Triangle Route
Firewall Rules Storage Space in Use
0%
5%
100%
Packet Direction:
WAN to LAN
Configured rules for this packet direction are displayed in the summary table below.
Action for packets that don't match firewall rules.
Block
Forward
Log packets that don't match these rules.
Status Source Address Destination Address Service Type Action Log Alert
1 Active Any 192.168.1.2 H.323(TCP:1720) Forward Disabled No

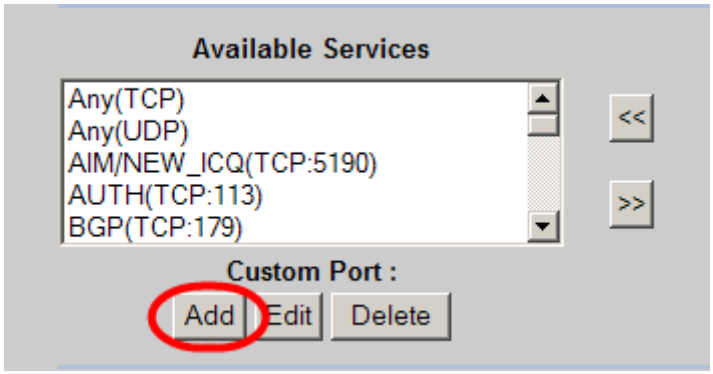
Firewall Rule Settings

Field	Description
Active	Select this check box to have the Business Secure Router use this rule. Clear this check box if you do not want the Business Secure Router to use the rule after you apply it.
Packet Direction	Use the drop-down list box to select the direction of packet travel to which you want to apply this firewall rule.
Source Address	Click **SrcAdd** to add a new address, **SrcEdit** to edit an existing one or **SrcDelete** to delete one.
Destination Address	Click **DestAdd** to add a new address, **DestEdit** to edit an existing one or **DestDelete** to delete one.
Service:	Select a service in the **Available Services** box on the left, then click **>>** to select it. The selected service shows up on the **Selected Services** box on the right. To remove a service, click on it in the **Selected Services** box on the right, then click **<<.**
Custom Port	Click this button to go to the **Custom Ports** screen. (see section **Editing Custom Ports** in this Guide)
Action for Matched Packets:	Use the drop down list box to select whether to **Block** (silently discard) or **Forward** (allow the passage of) packets that match this rule.
Log	This field determines if a log is created for packets that match the rule (**Match**), don't match the rule (**Not Match**), match either rule (**Both**) or no log is created (**None**).
Alert	Select the **Alert** check box to determine that this rule generates an alert when the rule is matched.

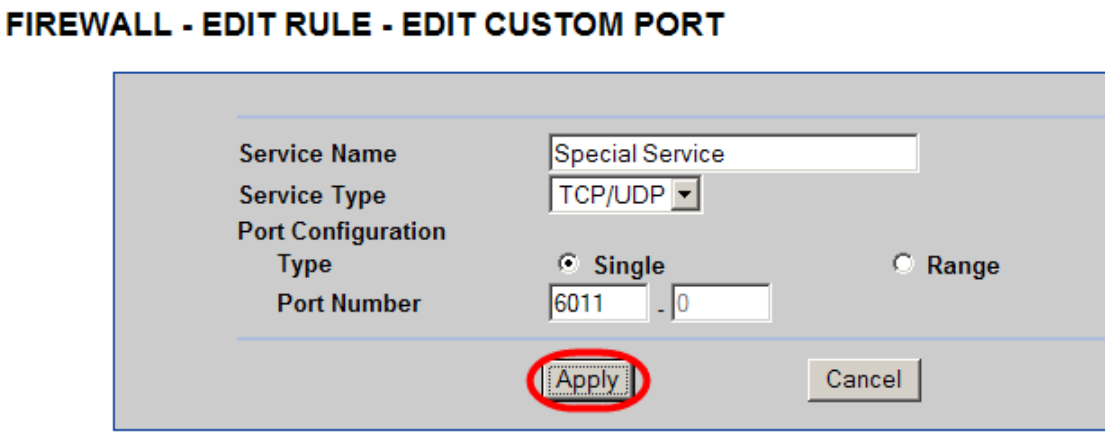
Editing Custom Ports

If the required service for the Firewall rule in the **Available Services** list is not present, you can create your own service. Pre-defined Services include Telnet, FTP, http etc.

1. Whilst in the **Edit Rule** screen, click on the **Add** button in the **Custom Ports** section.

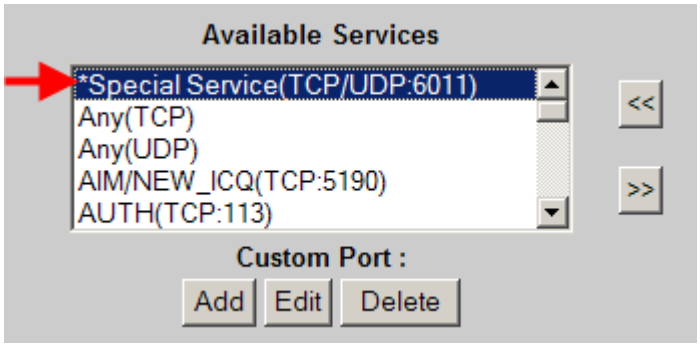


2. Enter a **Name**, **Service Type**, and either a **Single** port or **Range** of ports that defines the service.



3. Click **Apply** to save your settings.

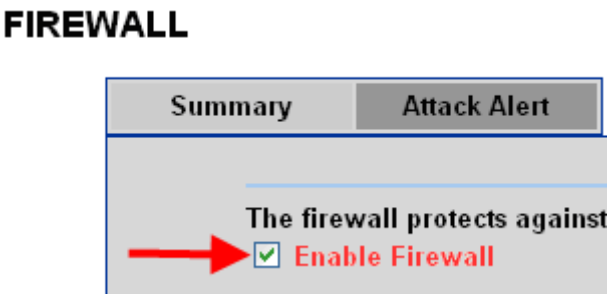
4. The service will now appear in the **Available Services** list. You will be able to select this service if required.



Enabling the Firewall

After configuring the firewall rules, you should ensure the firewall is enabled.

1. Whilst in the Firewall Summary screen, ensure the **Enable Firewall** tick box is selected.



Additional Configuration

The procedures detailed in this section are optional and not required in all situations.

Attack Alerts

Attack alerts are the first defense against DOS attacks. In the **Attack Alert** screen you may choose to generate an alert whenever an attack is detected. For DoS attacks, the BCM50 Integrated Router uses thresholds to determine when to drop sessions that do not become fully established. These thresholds apply globally to all sessions.

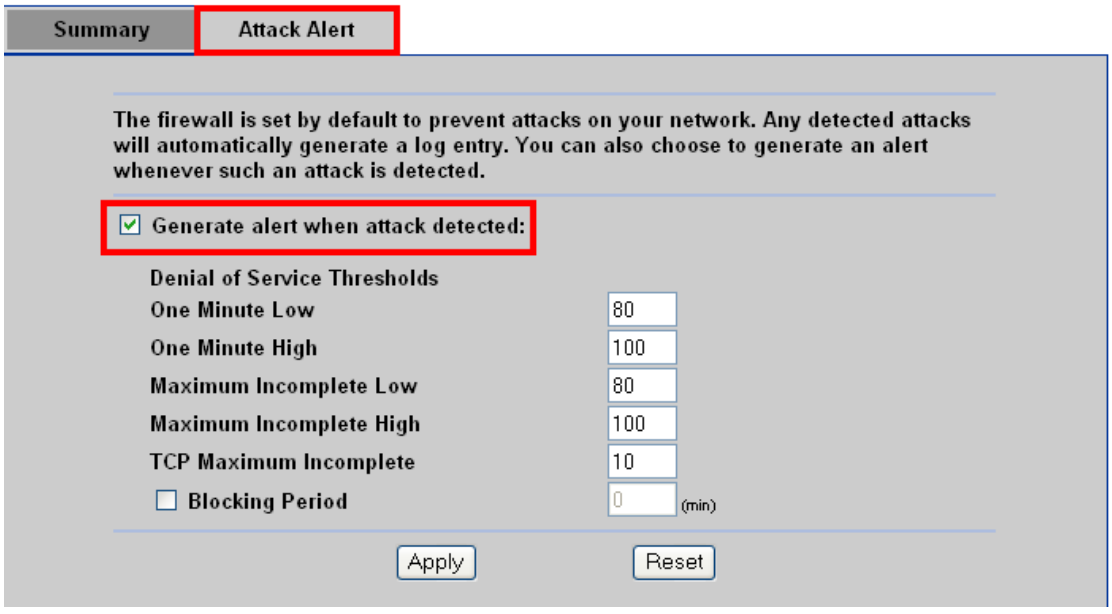
You can use the default threshold values, or you can change them to values more suitable to your security requirements.

Configuring Attack Alerts

1. Access the Web Router GUI (refer to the **Accessing the Web Router GUI** section of this guide).

2. From the **Main Menu**, click on **Firewall**.

3. In the **Attack Alert** tab, enable the Alerts function by ticking the **Generate alert when attack detected** check box.



4. Configure the rest of the detail settings and click **Apply** to save your settings.

Attack Alert Settings

Field	Default Value	Description
One Minute Low	80 existing half-open sessions.	This is the rate of new half-open sessions that causes the firewall to stop deleting half-open sessions. The BCM50 Integrated Router continues to delete half-open sessions as necessary, until the rate of new connection attempts drops below this number.
One Minute High	100 half-open sessions per minute. The above numbers cause the BCM50 Integrated Router to start deleting half-open sessions when more than 100 session establishment attempts have been detected in the last minute, and to stop deleting half-open sessions when fewer than 80 session establishment attempts have been detected in the last minute.	This is the rate of new half-open sessions that causes the firewall to start deleting half-open sessions. When the rate of new connection attempts rises above this number, the BCM50 Integrated Router deletes half-open sessions as required to accommodate new connection attempts.
Maximum Incomplete Low	80 existing half-open sessions.	This is the number of existing half-open sessions that causes the firewall to stop deleting half-open sessions. The BCM50 Integrated Router continues to delete half-open requests as necessary, until the number of existing half-open sessions drops below this number.
Maximum Incomplete High	100 existing half-open sessions. The above values causes the BCM50e/be Integrated Router to start deleting half-open sessions when the number of existing half-open sessions rises above 100, and to stop deleting half-open sessions with the number of existing half-open sessions drops below 80.	This is the number of existing half-open sessions that causes the firewall to start deleting half-open sessions. When the number of existing half-open sessions rises above this number, the BCM50 Integrated Router deletes half-open sessions as required to accommodate new connection requests. Do not set **Maximum Incomplete High** to lower than the current **Maximum Incomplete Low** number.
TCP Maximum Incomplete	10 existing half-open TCP sessions.	This is the number of existing half-open TCP sessions with the same destination host IP address that causes the firewall to start dropping half-open sessions to that same destination host IP address. Enter a number between 1 and 256. As a general rule, you should choose a smaller number for a smaller network, a slower system or limited bandwidth.
Blocking Period	Select this check box to specify a number in minutes (min) text box.	When **TCP Maximum Incomplete** is reached you can choose if the next session should be allowed or blocked. If you check **Blocking Period** any new sessions will be blocked for the length of time you specify in the next field (min)

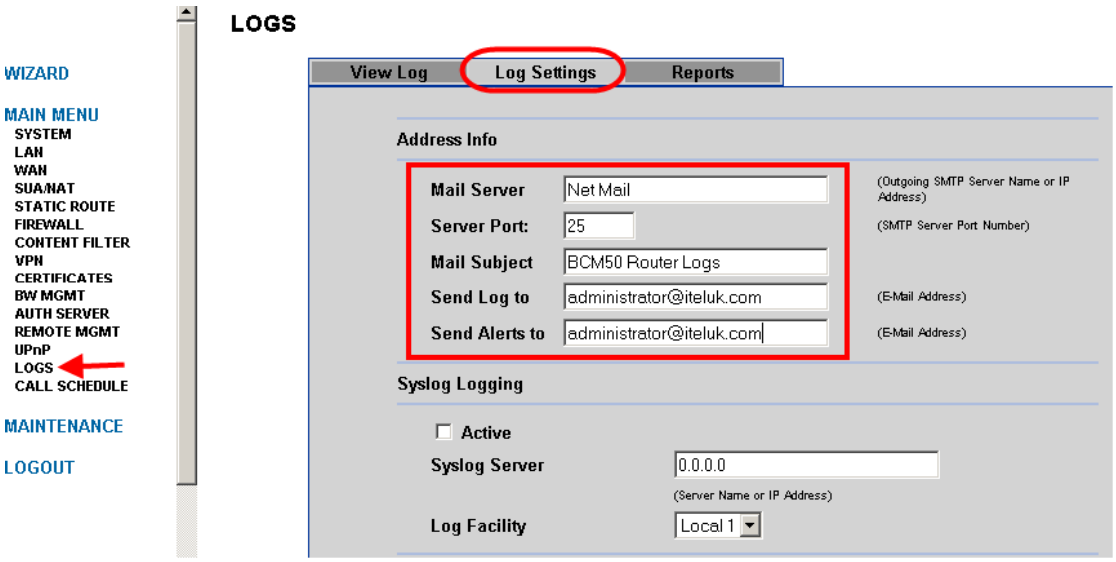
Field	Default Value	Description
		and all old incomplete sessions will be cleared during this period. If you want strong security, it is better to block the traffic for a short time, as it will give the server some time to digest the loading.

Attack Alert Destinations

You can configure an e-mail destination if you wish to be alerted about any attacks that occur against the router. Alerts are e-mailed as soon as they happen to the configured destination.

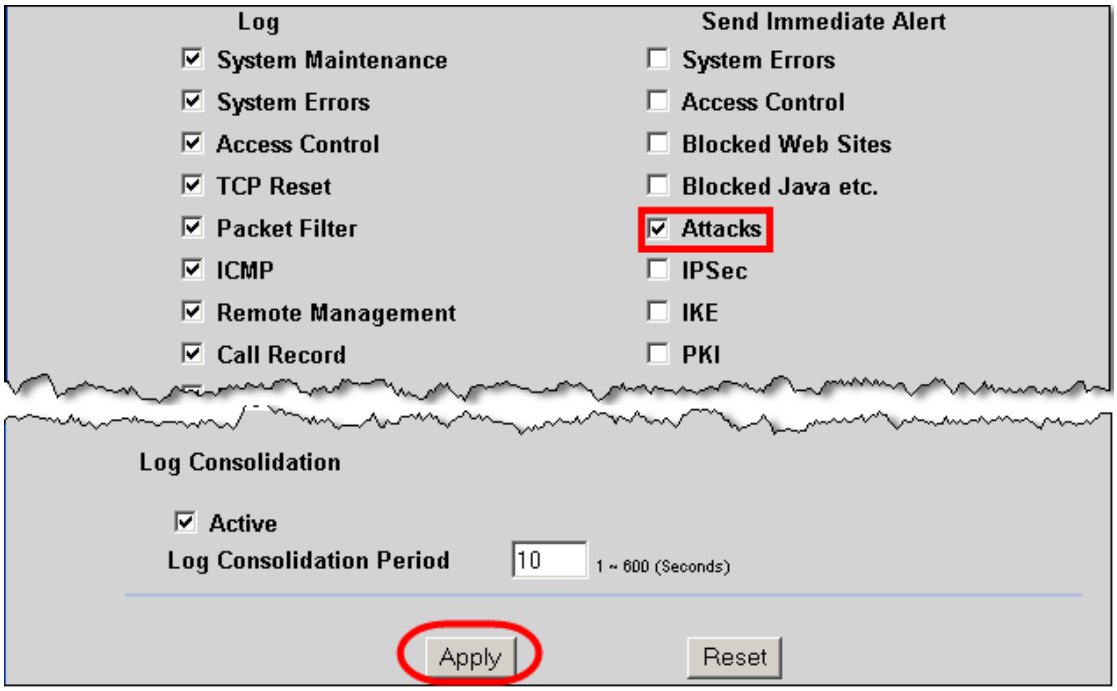
1. For either model router, access the Web router GUI.

2. From the **Main Menu** click on **Logs**, followed by the **Log Settings** tab.



3. Enter the name or IP Address of your mail server in the **Mail Server** field, and ensure that you specify the e-mail address of the person to send logs to in the **Send Alerts to** field.

4. Next tick the **Attacks** option box, found further down the screen in the **Send Immediate Alert** area.



5. Click **Apply** when finished.

Firewall Considerations

The following should be allowed for the BCM50e/be/a/ba to function correctly:

Port	Type	Description
5989	TCP	Required for running Element Manager across a firewall
25	TCP	SMTP used for Unified Messaging
143	TCP	IMAP used for Unified Messaging
161	UDP	SNMP management
162	UDP	SNMP traps
389	TCP	LDAP used for Unified Messaging
1222	TCP	LAN CTE client traffic
1718	TCP	H.323 signalling traffic
1719	TCP	H.323 signalling traffic
1720	TCP	H.323 signalling traffic
5000	UDP	QoS monitor probe packets
5060	UDP	SIP traffic
7000	UDP	Unistim IP set signalling traffic
20000-20255	UDP	Voice Path for IP telephony which is used when 28000 range is unavailable
28000-28255	UDP	Voice Path for IP trunks

Avaya Documentation Links

- BCM50e Integrated Router Configuration – Basics
- BCM50a Integrated Router Configuration – Basics